

CLAIMS

What is claimed is:

1. A device for irradiating tissue, comprising:
a fluorescent element positioned to receive pump
radiation and responsively generate emitted radiation, the
emitted radiation having substantially different spectral
characteristics with respect to the incident radiation; and
a redirector for redirecting at least a portion of the
emitted radiation toward a tissue target.

2. The device of claim 1, wherein the fluorescent element
comprises a fluorescent substance dispersed in a solid
medium.

3. The device of claim 2, wherein the fluorescent
substance includes fluorescent ions, and the solid medium
is selected from a group consisting of a solid-state
crystal and a glass.

4. The device of claim 2, wherein the fluorescent
substance includes a fluorescent dye, and the solid medium
is selected from a group consisting of a polymer and a
glass.

1 5. The device of claim 4, wherein the solid medium
✓ 2 comprises a polymer selected from a group consisting of
3 polymethyl methacrylate (PMMA) and polyvinyl toluene (PVT).

1 6. The device of claim 1, wherein the fluorescent element
✓ 2 comprises a liquid fluorescent dye solution.

1 7. The device of claim 6, wherein the dye solution is
✓ 2 static.

1 8. The device of claim 6, wherein the dye solution is
✓ 2 continuously pumped through the fluorescent element.

1 9. The device of claim 1, wherein the redirector comprises
✓ 2 a diffuse reflector.

1 10. The device of claim 9, wherein the diffuse reflector
✓ 2 has a frustro-conical shape.

1 11. The device of claim 1, wherein the pump radiation is
✓ 2 generated by a frequency-doubled solid-state laser.

1 12. The device of claim 1, wherein the pump radiation is
2 delivered to the fluorescent element through an optical
3 fiber.

1 13. The device of claim 1, wherein the pump radiation is
2 delivered to the fluorescent element through an articulated
3 arm.

14. The device of claim 1, wherein the redirector
2 comprises a reflective coating configured to reflect the
3 emitted radiation, the reflective coating being
4 substantially transparent with respect to the pump
5 radiation.

1 15. The device of claim 1, further comprising a
2 substantially transparent window having a proximal face
3 positioned adjacent to the fluorescent element and a distal
4 face for contacting the target.

1 16. The device of claim 15, further comprising means for
2 cooling the window.

17. The device of claim 1, wherein the redirector
2 comprises a waveguide including a reflective entrance face

3 and reflective walls, the entrance face having a
4 substantially transmissive aperture formed therein for
5 admitting pump radiation into the waveguide.

1 18. The device of claim 17, wherein the reflective walls
2 comprise a boundary between a waveguide core having a
3 relatively high index of refraction and a cladding material
4 having a relatively low index of refraction, the boundary
5 causing total internal reflection of a portion of the
6 emitted radiation.

1 19. The device of claim 17, wherein the reflective walls
2 comprise a reflective coating.

1 20. The device of claim 17, wherein the reflective walls
2 comprise a metallic coating.

1 21. The device of claim 17, wherein the reflective walls
2 comprise a dielectric coating.

1 22. A method for irradiating tissue, comprising the steps
2 of:
3 directing pump radiation onto a fluorescent element;

4 responsively generating emitted radiation at the
5 fluorescent element, the emitted radiation having spectral
6 characteristics substantially different from the incident
7 radiation;
8 receiving a portion of the emitted radiation at a
9 redirector; and
10 redirecting the received portion of the emitted
11 radiation toward a tissue target.

002099-52958580
1 23. The method of claim 22, wherein the step of directing
2 incident radiation onto the fluorescent element includes
3 directing incident radiation through an optical fiber.

Sub
1 24. The method of claim 22, wherein the step of
2 redirecting the emitted radiation includes reflecting the
3 emitted radiation from a diffuse reflector.

1 25. The method of claim 22, wherein the step of
2 redirecting the emitted radiation includes reflecting the
3 emitted radiation from a reflective coating, the reflective
4 coating being substantially transparent with respect to the
5 pump radiation. } ok

Sub 4

1 26. The method of claim 22, wherein the step of
2 redirecting the emitted radiation includes reflecting the
3 emitted radiation from the boundary between a waveguide
4 core and cladding material, the cladding material having a
5 substantially lower index of refraction than the waveguide
6 core.

✓ 1 27. The method of claim 22, wherein the tissue target
2 comprises a vascular lesion.

00585675-060700
✓ 1 28. The method of claim 22, wherein the tissue target
2 comprises a tumor.

✓ 1 29. The method of claim 22, wherein the tissue target
2 comprises hair.

✓ 1 30. The method of claim 22, wherein the tissue target
2 comprises a pigmented lesion.

✓ 1 31. The method of claim 22, further comprising the steps
2 of cooling the tissue target.

1 32. The method of claim 31, wherein the step of cooling
2 the tissue target comprises:

3 providing a substantially transparent and thermally
4 conductive window;
5 placing a face of the window in thermal contact with
6 the tissue target; and
7 cooling the window.

33. A system for irradiating tissue, comprising:

- a pump radiation source for generating pump radiation;
- a fluorescent element positioned to receive the pump radiation and responsively generate emitted radiation, the emitted radiation having substantially different spectral characteristics with respect to the incident radiation; and
- a redirector for redirecting at least a portion of the emitted radiation toward a tissue target.

Add A4

Chains 1 & 33 are same.
device vs system.